

## Regularization/R (Q7L8)

30% (6/20)

- ✗ 1. In Poisson regression...
- ☐ A The asymptotic distribution of the maximum likelihood estimates is multivariate normal.
  - ☐ B The distribution of the maximum likelihood estimates is multivariate normal.
  - ☐ C The asymptotic distribution of the maximum likelihood estimates is multivariate Poisson distribution.
  - ☐ D I do not know
- ✓ 2. In the case of intercept-only model
- ☒ A The mean of the dependent variable equals the exponential value of intercept
  - ☐ B The mean of the dependent variable equals the intercept
  - ☐ C The mean of the dependent variable equals 0
  - ☐ D I do not know
- ✗ 3.  $\ln(\lambda) = 0.6 - 0.2 * \text{female}$  [ $\lambda$  = the average number of articles] Note:  $e^{(-0.2)}=0.78$
- ☒ A One unit increase in female brings a 0.2 decrease in  $\ln(\lambda)$ .
  - ☐ B Being female decreases the average number of articles by 0.78 percent
  - ☐ C Being female decreases the average number of articles by 22%
  - ☐ D I do not know
- ✓ 4. In the multiple linear regression, we assume that...
- ☒ A The number of observations is much larger than the number of variables ( $n \gg p$ )
  - ☐ B The number of observations is slightly larger than the number of variables ( $n > p$ )
  - ☐ C The number of observations equals than the number of variables ( $n = p$ )
  - ☐ D The number of observations is less than the number of variables ( $n < p$ )
  - ☐ E It is not important
  - ☐ F I do not know

- ✗ 5. The way of solving the problem of a large number of variables is...
- ☐ A Subset Selection & Shrinkage (Regularization)
  - ☒ B Shrinkage (Regularization) & Maximum Likelihood estimation
  - ☐ C Dimension Reduction & OLS estimation
  - ☐ D I do not know
  - ☐ E The absence of the right answer
- ✗ 6. The bias of an estimator (e.g.  $\hat{z}$ ) equals...Hint: the OLS coefficients are unbiased :)
- ☐ A  $E(\hat{z}) - z$
  - ☐ B  $E(\hat{z}^2) - [E(z)]^2$
  - ☐ C  $[E(\hat{z}^2) - E(z)]^2$
  - ☐ D  $E(\hat{z}^2)$
  - ☐ E I do not know
- ✗ 7. The main idea of regularization is
- ☐ A To introduce a small amount of bias in order to have less variance.
  - ☐ B To introduce a small amount of variance in order to have less bias.
  - ☐ C To introduce a small amount of variance and bias in order to have less bias.
  - ☒ D I do not know
- ✗ 8. With which function we can show regularization in R
- ☐ A `glmnet()`
  - ☒ B `regular()`
  - ☐ C `lm()`
  - ☐ D `glm()`
  - ☐ E I do not know
- ✗ 9. How the tune of any parameter can be made
- ☐ A using Cross validation
  - ☐ B It is impossible
  - ☒ C I do not now
  - ☐ D using larger sample
  - ☐ E only having population

- ✗ 10. Elastic Net is
- ☐ A the combination of L1 and L2 regularization
  - ☒ B the combination of L2 and L3 regularization
  - ☐ C is independent from other types of regularization
  - ☐ D I do not know
  - ☐ E not a type of regularization

- ✓ 11. Regularization is used only for
- ☐ A Poisson Regression
  - ☐ B Linear Regression
  - ☐ C Logistic Regression
  - ☒ D any regression
  - ☐ E I do not know

- ✗ 12. Regularization can solve the problem of
- ☐ A heteroscedasticity
  - ☐ B multicollinearity
  - ☐ C autocorrelation
  - ☐ D I do not know

- ✓ 13. As a result of regularization we will have
- ☒ A smaller slope than in case of OLS
  - ☐ B larger slope than in case of OLS
  - ☐ C the slope remains the same
  - ☐ D I do not know

- ✗ 14. The ridge coefficient estimates shrink towards zero
- ☐ A when lambda increases
  - ☒ B when lambda decreases
  - ☐ C when lambda = 0
  - ☐ D I do not know

✓ 15. Which one can shrink the slope all the way to 0?

- ☒ A Lasso
- ☐ B Ridge
- ☐ C Regression
- ☐ D I do not know

✗ 16. When  $\lambda = 0$ , we have

- ☐ A Ridge
- ☒ B Lasso
- ☐ C EL
- ☐ D Regression
- ☐ E I do not know

✓ 17. When  $\alpha = 0$ , we have

- ☒ A Ridge
- ☐ B Lasso
- ☐ C EL
- ☐ D Regression
- ☐ E I do not know

✗ 18. ...variables need to be incorporated in the model according to domain knowledge...

This statement is true for...

- ☐ A Ridge
- ☐ B Lasso
- ☐ C EL
- ☐ D Regression
- ☐ E I do not know

✗ 19. Which function can help to perform cross-validation for regularization in R?

- ☐ A `cv.glmnet()`
- ☐ B `cros_val()`
- ☐ C `glmnet(method = "cv")`
- ☒ D I do not know

✗ 20. Why we use `set.seed()` in R?

- ☐ A To have universal result
- ☐ B To perform better result
- ☐ C To have random models
- ☐ D I do not know